CLAIM AMENDMENTS

(currently amended) A roping detector for a hydrocyclone 1. having a separation chamber with an underflow discharge which under normal operating conditions is conical and impacts upon a splash skirt, comprising:

a vibration sensor mounted on the splash skirt for detecting a change in the discharge indicative of roping.

- 2. (original) The roping detector of Claim 1, wherein the vibration sensor is an ultrasonic sensor.
- (original) The roping detector of Claim 2, wherein the ultrasonic sensor produces an output signal relative to a baseline threshold which is indicative of a condition of the underflow discharge.
- (currently amended) A hydrocyclone with a roping detector, comprising:
- a separation chamber with an underflow discharge which under normal operating conditions is conical,
 - a splash skirt upon which the conical discharge normally

impacts, and

a vibration sensor mounted on the splash skirt for detecting a change in the discharge indicative of roping.

- 5. (original) The hydrocyclone of Claim 4, wherein the vibration sensor is an ultrasonic sensor.
- 6. (original) The hydrocyclone of Claim 5, wherein the ultrasonic sensor produces an output signal relative to a baseline threshold which is indicative of a condition of the underflow discharge.
- 7. (currently amended) A method of detecting roping in a hydrocyclone having a separation chamber with an underflow discharge which under normal operating conditions is conical and impacts upon a splash skirt, comprising the step of:

monitoring vibration of the splash skirt to detect a change in the discharge indicative of roping.

8. (original) The method of Claim 6, wherein the vibration is monitored with an ultrasonic sensor.

- (original) The method of Claim 8, further including the step of using the ultrasonic sensor to produce an output signal relative to a baseline threshold which is indicative of a condition of the underflow discharge.
- 10. (currently amended) A roping detector for a hydrocyclone having a separation chamber with an underflow discharge which under normal operating conditions is conical, comprising:
- a splash skirt having a cylindrical side wall upon which the conical discharge impacts, and
- an ultrasonic sensor mounted on the side wall for detecting a change in the discharge indicative of roping.
- (original) The roping detector of Claim 10, wherein the ultrasonic sensor produces an output signal relative to a baseline threshold which is indicative of a condition of the underflow discharge.
- (original) The roping detector of Claim 10, wherein the 12. ultrasonic sensor is enclosed within a housing on an outer side of the side wall.

- 13. (original) The roping detector of Claim 12, wherein the ultrasonic sensor produces an output signal relative to a baseline threshold which is indicative of a condition of the underflow discharge.
- 14. (new) A roping detector for a hydrocyclone having a splash skirt and an apex adapted to produce an underflow discharge with a cone angle impacting on the splash skirt, comprising:
- a vibration sensor mounted on the splash skirt and adapted to produce an output signal indicative of a variation of the cone angle of the underflow discharge.
- 15. (new) The roping detector of Claim 14, wherein the vibration sensor is an ultrasonic sensor.
- 16. (new) A hydrocyclone, comprising:
- a separation chamber including an apex adapted to produce an underflow discharge with a cone angle;
- a splash skirt connected to the apex adapted to receive the underflow discharge; and
- a vibration sensor mounted on the splash skirt adapted to produce an output signal indicative of a variation of the cone angle of the underflow discharge.

- 17. (new) The hydrocyclone of Claim 16, wherein the vibration sensor produces an output signal relative to a baseline threshold set to a level corresponding to a magnitude of vibration produced by a normal impact of the underflow discharge on the splash skirt.
- (new) The hydrocyclone of Claim 17, wherein said normal 18. impact corresponds to a pre-determined cone angle.
- 19. (new) The hydrocyclone of Claim 18, wherein the vibration sensor is an ultrasonic sensor.
- (new) A method of detecting roping in an underflow discharge of a hydrocyclone, comprising the steps of:

establishing a baseline threshold indicative of a normal impact of the underflow discharge on a splash skirt of the hydrocyclone, said normal impact corresponding to a predetermined cone angle of the underflow discharge impacting on the splash skirt; and

producing an output signal relative to the baseline threshold indicative of a variation of the cone angle of the underflow discharge from said pre-determined cone angle.

- 21. (new) The method of Claim 20, wherein the step of producing an output signal includes measuring a vibration caused by the underflow discharge striking the splash skirt.
- 22. (new) The method of Claim 23, wherein the vibration is measured with an ultrasonic sensor.